Factors associated with adolescent fertility: A study of Ethiopia

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Abstract

Objective: To determine the level of adolescent fertility and to identify factors associated with adolescent fertility, as well as compare the factors associated with adolescent fertility among all and ever-married adolescents.

Method: A nationally representative data was used from Ethiopian Demographic Health Survey (EDHS), 2011. From large data set, 3,323 observations of adolescents 15-19 years of age were extracted. Firstly, the characteristics of the study population were summarized. The outcome variable was live birth experience. The predictor variables were age, marital status, household size, educational level, region, religion, employment status, contraceptive use, ideal family size, drinking alcohol and chewing khat for all adolescent analyses; additional variables like age at first marriage, husband education level were included in ever-married group analyses. Secondly, separate bivariate and multivariate logistic regression analyses were conducted to identify the factors associated with adolescent fertility.

Results: The live birth experience among all adolescents was 10.74%, while it was 42.68% among ever-married adolescent group. Age, marital status, household size, region, educational status, religion, contraceptive use, ideal

family size were significantly associated with live birth experience; under adjusted comparison, age, marital status and some regions were positively associated with live birth experience, while education level of secondary and above was negatively associated with live birth experience in all adolescents mode. In the ever-married adolescents group analyses; age, household size, region, educational level, child death experience, age at first marriage, ideal family size and drinking alcohol were significantly associated with live birth experience; under adjusted comparison, age, some regions and ideal family size of greater than four were positively associated with live birth experience, while late age at first marriage and living in larger household size were negatively associated with live birth experience.

Conclusion: Live birth experience among adolescents was relatively high in Ethiopia. Based on the results of this study to identify factors associated with adolescent fertility, improving the educational status of adolescents to secondary and above level, providing access to basic reproductive health services in regions with high adolescent fertility, and awareness creation of the family and marriage law are highly needed to mitigate the challenges of adolescent fertility in Ethiopia.

Key Words: Live birth experience, adolescent fertility, reproductive health challenges, Ethiopia

Ⅰ. Introduction

1.1 Background

Adolescence is a period of transition from childhood to adulthood, mainly characterized by a progressive change in physical, biological, emotional and social status. The age range from 10-19 years is considered an adolescence period, while people in the 10-24 year age range generally are called youth (World Health Organization, 2011).

Adolescence is a highly transitory period of life; the number and types of changes that adolescents experience in family structure, livelihood, schooling, communities, and identities are unparalleled in any other period. Literatures on adolescents in developing countries and Sub-Saharan Africa in particular, indicates that it is necessary to treat this period of life differently from childhood and adulthood (Jokela & Keltikangas-Jarvinen, 2009). To cope with diverse and rapid changes that occur in their lives, adolescents have specific needs for new types of decision making powers. Adolescents needs safe places to meet with peers and mentors as well as resources to find alternatives to pressure to

leave colleges and universities, engage in illegal or unsafe work, abuse substances, marry early, have unsafe sex, and exchange sex for gifts or money (United Nations Population Fund, 2011).

Adolescent fertility, also known as teenage fertility, is a condition where a woman has given live birth before twenty years of age. Teenage fertility is calculated as the proportion of women aged 15-19 who have ever given live birth by the time of the survey (Central Statistical Agency, 2006).

Worldwide adolescents suffer from a disproportionate share of early marriage, unwanted pregnancy, unsafe abortion, sexually transmitted infections including the dreaded HIV/AIDS, female genital cutting, malnutrition, anemia, infertility, sexual and gender based violence and other reproductive health challenges. About 16 million adolescent girls give birth each year, roughly 11% of all births worldwide. Almost 95% of these births occur in developing countries. They range from about 2% in China to 18% in Latin America and the Caribbean. Half of all adolescent births occur in just seven countries: Bangladesh, Brazil, the Democratic Republic of Congo, Ethiopia, Nigeria, India and the United States (World Health Organization, 2008).

Adolescent pregnancy is associated with negative outcomes for the mother, the new born and the society at large. For the mother, pregnancy brings increased health risks like; severe morning sickness, pregnancy associated hypertension, pre-term labor, premature birth and difficult labor leading to higher operative deliveries. Similarly the newborn also suffers from low birth weight, perinatal deaths; increased neonatal deaths (Malabarey, Balayla, Klam, Shrim, & Abenhaim, 2012; Thaithae & Thato, 2011).

The health risks to the young mothers due to pregnancy and early childbearing have been documented in several studies across the globe. One of such studies has revealed that, maternal mortality rates for adolescent mothers under the age of 16 are four times higher than, those mothers who bear children above the age of 20 (Conde-Agudelo, Belizan, & Lammers, 2005). Factors complicating the perinatal outcome of adolescent pregnancy, are exacerbated by the fact that, pregnant adolescents tend to care less about getting the necessary antenatal services, having effect on the nutritional intake of pregnant adolescents, leading to low birth weight and its consequences. This has been supported by a study which analyzed antenatal follow up and

weight gain, compared to older pregnant mothers adolescents have gained lower weight and had significantly lower prenatal care visits (Thaithae & Thato, 2011).

Moreover childbearing at a young age poses risk of school dropout and truncated educational opportunities, as early motherhood impedes the pursuit of other life options that might compete child bearing, due to the fact that child bearing hinders mothers educational attainment it often results in reducing economic opportunities for the mother and the household as a whole (Walker, 2012).

Furthermore adolescent pregnancy has socio-economic impacts on the individual as well as the overall society; numerous studies have shown as association between adolescent pregnancy, and negative social and economic effects on both the mother and her child. Studies have shown that, delaying adolescent births could significantly lower population growth rates, potentially generating broad economic and social benefits (Blum, Bastos, Kabiru, & Le, 2012; Canning & Schultz, 2012).

Despite the downward trend, adolescent fertility remains very prevalent,

particularly in the poorest countries like Ethiopia. The age at which women in developing countries have their first child has important consequences on the demographic character of the population. Long term demographic effects of adolescent fertility may include larger completed family sizes. Childbearing at younger ages implies a higher rate of fertility and population growth because of a shorter length of time between generations (Ezeh, Mberu, & Emina, 2009).

Though there are studies done on the specific topic of adolescent fertility in Ethiopia (Berhane, Biadgilign, Amberbir, Morankar, & Deribe, 2011; Gebremedhin & Betre, 2009; Gurmu & Mace, 2008; Kassa, Berhane, & Worku, 2012; Mekonnen & Worku, 2011a, 2011b; Sibanda, Woubalem, Hogan, & Lindstrom, 2003; Tilahun, Mengistie, Egata, & Reda, 2012), these studies have mainly focused on factors related to educational status, age at first birth, age at first marriage and type of residence. However equally important factors like, Household size, ideal family size, Substance use by adolescents, employment status of women, child death experience, regional variation, level of education of the husband/partner, have been given little attention, therefore this study will use a recent nationally representative data to confirm previous studies and observe new facts

and it will help in bridging the information gap and shade some more light on the adolescent fertility challenges in Ethiopia.

1.2 Objectives

This study aims to investigate factors associated with adolescent fertility in Ethiopia. This study is constructed as follows;

1. To determine the level of adolescent fertility (Live birth experience) among Ethiopian adolescents.
2. To identify factors associated with adolescent fertility; demographic, socio-economic, fertility-related and behavioral factors.
3. To compare factors influencing adolescent fertility, among all and married adolescents.

Ⅱ. Adolescent Reproductive Health Challenges

2.1 Country profile:

Ethiopia is a country located in the horn of Africa, which is at the cross road between the Middle East and Africa. Thus, throughout its long history, Ethiopia has been a melting pot of diverse customs and cultures. As a result, more than 80 different languages are spoken by its people Ministry of Information Ethiopia (MOI, 2004). Ethiopia is administratively structured into nine regional states: Tigray, Affar, Amhara, Oromiya, Somali, Benishangul-Gumuz, Southern Nations Nationalities and Peoples (SNNP), Gambela, and Harari. It also contains two city administrations, Addis Ababa (Capital) and Dire Dawa administration councils (Central Statistical Agency, 2006).

Ethiopia's topographical features range from the highest peak at Ras Dashen Mountain, 4550 meters above sea level down to the Affar depression, 110 meters below sea level (CSA, 2009). The total surface area of the country is 1.1 million square kilometers. Djibouti, Eritrea, the Republic of Sudan, the Republic of Southern Sudan, Kenya, and Somalia border the country.

Ethiopia is an agrarian country and agriculture accounts for 43% of the gross domestic product (GDP) (CSA, 2009). It is among the least developed countries in the world with an income per capita of 365 USD (HDI, 2011) and 29.3% of the total population living below poverty line specified by United Nations, of less than two US dollars a day.

Ethiopia is one of the least urbanized countries in the world; only 16 percent of the population lives in urban areas. The majority of the population lives in highland areas and the main occupation is those settled in the rural areas of the country is farming, and those living in the lowlands are mostly inhabited by pastoral people. More than 80% of country's total population lives in the regional states of Amhara, Oromiya, and SNNP (Central Statistical Agency, 2011). The county is home to more than 80 ethnic groups, which vary in population size from more than 26 million people (Oromo) to fewer than 100 (CSA, 2010).

Ethiopians represent a very religious and cultural society, manifested by the wide patriarchal pattern of parenting, promoting pro-natal view and large family size; this has been reflected with, persistent high total fertility rates in the last three consecutive Demographic and

Health Surveys. Though the total fertility rate has shown some decline from 5.5 in 2000 to 5.4 in 2005 and the most recent Ethiopian demographic survey has revealed that, total fertility rate is 4.8 in 2011, it is still among the highest even by Sub-Saharan African standards. The fertility rate has wide discrepancy in the urban and rural setting with 2.6 and 5.5 total fertility rate respectively (Central Statistical Agency, 2006).

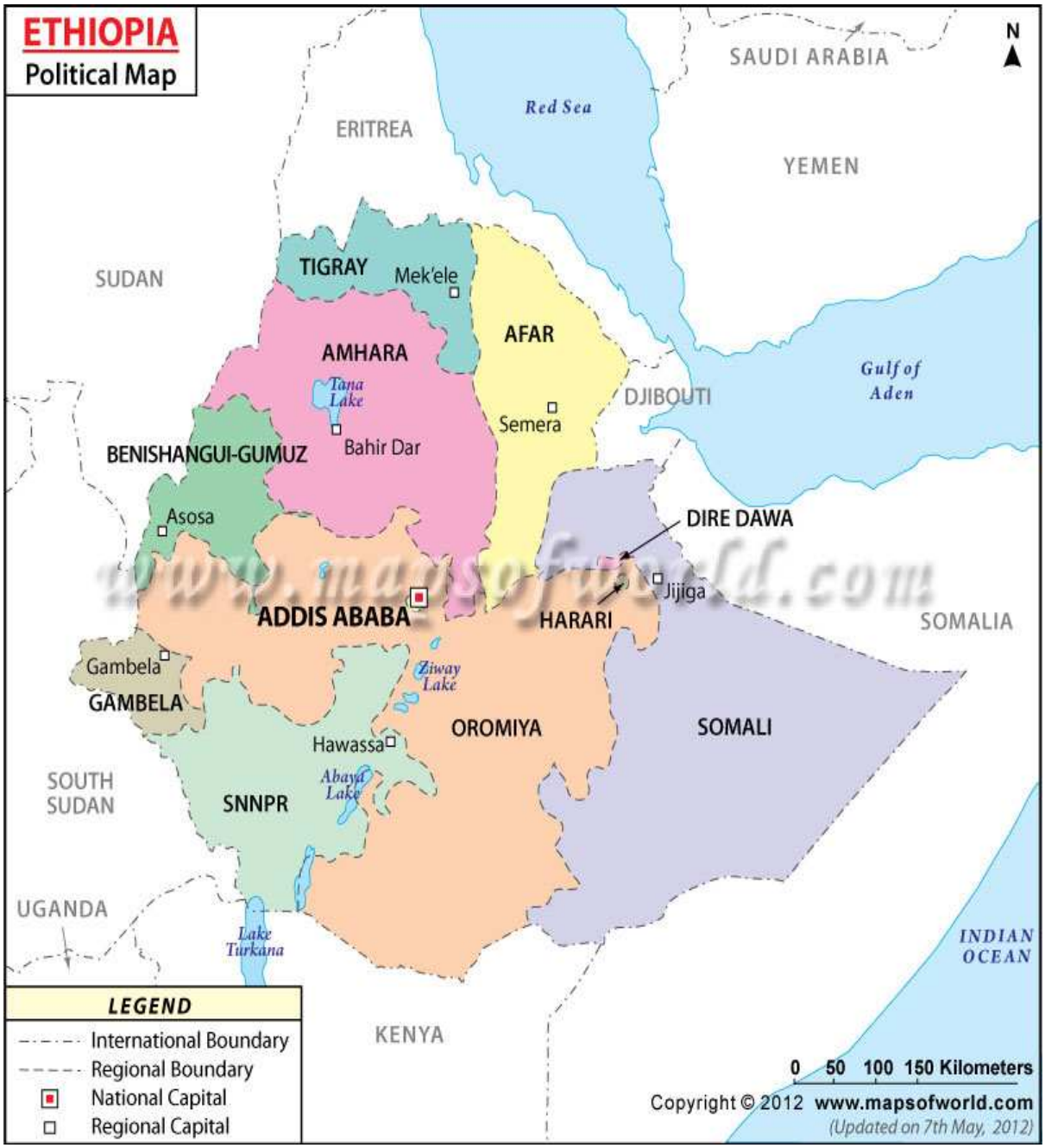
The population has increased steadily over the past three decades from 42.6 million in 1984 to 53.5 million in 1994 and 73.8 million in 2007. There were slight declines in the population growth rate over this period, from 3.1 percent per annum in 1984 to 2.9 percent in 1994 and 2.2 percent in 2007, it still is a cross cutting issue as about two million individuals are added to the population every single year (Central Statistical Agency, 2011).

Ethiopia's health care system, implements a four-tier health service delivery system characterized by a primary health care unit (PHCU), comprising of five satellite Health posts and one Health center, to serve 5,000 and 25,000 people respectively. PHCU includes, district hospital that serves 250,000 people, a zonal hospital for 1

million inhabitants and specialized hospitals which is expected to serve 5 million people (Ministry of Health, 2009).

The health indicators of Ethiopians conform to those of many developing countries, characterized by shorter life expectancy, high morbidity and mortality for infants, under-five children and mothers. The health status remains relatively poor as a result, vital indicators from Demographic and Health Survey 2005, reveals an average life expectancy of 54 years (53.4 Years for male and 55.4 for female), Infant Mortality Ratio (IMR) of 77/1000, an Under-five Mortality Rate of 161/1000 and a Maternal Mortality Ratio (MMR) of 590/100,000 which is among the highest in the world (Ministry of Health, 2011).

Figure 1 Map of Ethiopia: Administrative regions



Source: Maps of World (www.mapsofworld.com)

2.2 Adolescent Reproductive Health Challenges in Ethiopia

Adolescents constitutes one third of the total population of Ethiopia. Their number is expected to grow from 20.3 million in 2000 to 45 million in 2020. The reproductive health challenges of adolescents in Ethiopia are multifaceted and integrated. Childbearing begins at early age: forty-five percent of the total births in the country occur among adolescent girls and young women. Sexual violence and commercial sex work has become common phenomenon among young girls. As a result, they have become primary victims of the HIV/AIDS crises that have spread throughout the country. In general young people are at great risk for reproductive health problems. The reproductive health challenges faced by adolescents of the country is aggravated by the overall poor socioeconomic, environment and harmful traditional practice (Abubeker, 2004; Arowolo, 2010).

Sexual activity among adolescents in Ethiopia, particularly those residing in urban areas, has resulted in a large number of unintended pregnancies, and illegal abortions. Studies carried out in the country indicate that complications from unsafe abortions accounted for almost 55 percent of all recorded maternal deaths, 13 percent of

which occurred among women under the age of 20. The number of cases of sexually transmitted infections, including HIV/AIDS, is also steadily increasing (Ministry of Health, 2009).

In Ethiopia sexual and reproductive health is characterized by early marriage, corresponding with menarche, and early childbearing with consequent large completed family size adding to the rapid population growth. Contraception is rare and abortion is illegal and unsafe. The median age at which women age 25-49 first had sexual intercourse is 16. Three in ten in this age group have had sex by age 15, two in three by age 18, and more than 80 percent by age 20. There is gradual increase in the proportion of young women who have ever had sex. This increase is more pronounced among experienced compared with nearly one in four women age 16 years, 27 percent of women age 17 years, and about one in two women age 18 and 19. The percentage of women who have ever had sex increases gradually from 70 percent among women age 20 to 84 percent among women age 24, with the largest percent increase between age 19 and 20. On the other hand, men initiate sex an average four years later than women (Doyle, Mavedzenge, Plummer, & Ross, 2012).

Adolescent pregnancy is one of the worst reproductive health challenges faced by adolescents; pregnancy at this young age may endanger their health, chances of education and marriage, and may of their hopes for the future. Adolescents are too young, too poor or too inexperienced to become pregnant and have a child or care for a child. Consequently significant proportion of pregnant adolescents turn to abortion, where abortions are performed by unskilled providers, in unsafe conditions, which further exacerbate it's health risks and even death (Abubeker, 2004; Kaufman, de Wet, & Stadler, 2001).

In addition to the above mentioned reproductive health challenges faced by adolescents in Ethiopia, they also suffer tremendously from gender inequality, sexual coercion, polygamy, female genital cutting, unplanned pregnancy and closely spaced pregnancies, abortion, sexually transmitted infections and HIV/AIDS. Lack of education and high unemployment and extreme poverty exacerbate and perpetuate the reproductive health problems faced by adolescents in the country (United States Agency for International Development, 2004)

Adolescents are the future of any society, proper recognition of

their challenges and difficulties and preserving their health and enabling the optimal utilization of their immense potential will foster the sustainability of development efforts. As the youth of the SSA are acquiring better knowledge and skills, it necessary for all concerned bodies and the larger community to pull them out of poverty. This can only be achieved, by securing the health of the youth.

Ⅲ. Methods

3.1 Data source

This study uses secondary data from the Ethiopian Demographic and Health Survey (EDHS) 2011, which is a nationally representative sample data. The primary purpose of this survey was to furnish policymakers and planners with detailed information on fertility, family planning, infant, child and adult maternal mortality, maternal and child health, nutrition, and knowledge of HIV/AIDS and other sexually-transmitted infections. The 2011 EDHS was carried out under the Ministry of Health of Ethiopia by Central Statistics Agency (CSA) and ICF International through funding from USAID. Permission to access and use the data was requested and obtained by an online application to the administrator of the database in USA. Details of information concerning the data can be obtained at the following web page: Measure Demographic Health Surveys (Central Statistical Agency, 2011).

3.2 Sampling frame and sample selection

The 2011 EDHS used the sampling frame provided by the list

of census enumeration areas with population and household information from the 2007 National Population and Housing census. Administratively, regions in Ethiopia are divided into zones, and zones into administrative units called wereda. Each wereda is further subdivided into the lowest administrative unit called kebele.

During the 2007 census each kebele was subdivided into census enumeration areas (EAs). The 2011 EDHS sample was selected using, two-stage cluster design, and EAs were the sampling unit for the first stage. The sample included 624 EAs, 187 in urban areas and 437 in rural areas. Households comprise second stage of sampling. A complete listing household was conducted in each of the 624 EAs selected from September 2010 through January 2011. A representative sample of 17,817 household was selected for 2011 EDHS. The individual women data is used for this study and all women within the age group of 15-19 were selected.

All female adolescents age from 15-19 years from the women data were selected, the total number were 3,835 after proper data cleaning, a total of 3,323 individuals were analyzed for all adolescents group, and 806 adolescents, for ever-married sub-group

analysis.

3.3 Measures and variables

This study analyzed the specific measure of adolescent fertility; there are multiple ways to measure adolescent fertility; age specific fertility rate, total fertility rate, children ever born and total fertility rate (TFR) is a summary measure of fertility and can be interpreted as the average number of births a hypothetical woman would have at the end of her reproductive life, if she were subject to the currently prevailing age specific fertility rate throughout her reproductive age, while age specific fertility rate (ASFR) is number of births per year per women of a specific age group, the other measure of fertility is children ever born (CEB), which is number of children ever born at various age of the mother, this is presented in a continuous scale, and the measure of fertility used in this study is derivative of the children ever born (CEB) in categorical scale, if the adolescent had no children ever born(no event) to the date of the interview, live birth experience is taken as zero, and if the respondent had any live birth experience (event), then live birth experience event is taken as one. Therefore live birth experience is a binary outcome with event or no-event. So the

dependent variable used in this study is Live birth. Live birth comprises information on the experience of whether the respondent had live birth up to the survey date.

Live birth experience, the outcome variable is treated as a categorical variable in both bivariate and multivariate analyses. The demographic, socioeconomic, fertility-related and behavioral factors used as independent variables are; age of respondents, marital status, household size, region, educational level, religion, employment status, contraception use, ideal family size and use of substance (chewing Khat or Drinking alcohol). In sub-group analysis for ever-married adolescents child, age at first marriage, child death experience and husband's education level, have been included as independent variables.

In previous Ethiopian studies on adolescent fertility; age, marital status, education level, employment status and contraceptive use were significantly associated with adolescent fertility (Gebremedhin & Betre, 2009; Kassa et al., 2012; Mekonnen & Worku, 2011a, 2011b; Sibanda et al., 2003). However religion, household size, ideal family size had mixed effects on adolescent fertility (Adhikari, 2010; Ibisomi, Gyimah, Muindi, & Adjei, 2011). Many of the independent variables

were categorical variables. For example the variable ideal family size refers to respondents' perceptions concerning the ideal number of children they would like to have. This variable is categorized into three groups depending on its distribution (up to two children, three to four children and above four children) for both bivariate and multivariate analyses.

3.4 Analytical procedures

Initially, descriptive analysis was used to describe the number and percentage of respondents according to demographic, socio-economic, fertility-related and behavioral patterns, for all adolescents and for adolescents who were ever-married. Then to identify the association between the outcome variable live birth experience and independent variables, bivariate analyses were conducted for both groups using chi-squared test, before multivariate analyses were run, the relationship between independent variables were checked for Multicollineality and independent variables with their p-value less than 0.20 on chi-squared test, were inserted in to the multivariate analysis to identify differentials of the adolescent fertility.

Furthermore, the net effect of each predictor variable on the dependent variable after controlling for the effect of other predictors was measured via multivariate analysis (Multivariate logistic regression). Multivariate analyses were performed separately for all adolescents and for ever-married adolescents, in both bivariate and multivariate analyses. Value of p <0.05 were considered statistically significant. All analyses were performed using SAS version 9.2 (SAS institute Inc., Cary, NC, USA).

Ⅳ. Results

4.1 Characteristics of study subjects

Table 1 revises characteristics of Ethiopian female adolescent aged 15-19 years from the data of the study, for all adolescents and ever-married adolescents. The age distribution among all adolescents shows, young adolescents aged 15-17 were 60% while those aged between 18-19 were about 40% of the study population, among ever-married group the age distribution showed, one third of them were in the age group of 15-17 and the remaining two-third of the ever-married adolescents were 18-19 years of age. The marriage pattern among all adolescents was that, three-fourth (75%) of the them were never married, while the remaining one-fourth of the adolescents were ever-married, of which 80% of them were still in the marriage union by the time of interview, while 20% of the ever-married adolescents were already, separated, divorced or widowed.

As to the size of family in which the adolescents live with; about 67% of all adolescents live in a large family size of above five family members, while the remaining third live with relatively smaller

family size of less than four. The family size pattern among ever-married adolescent group was that, 46% of them were living with bigger family size, while the rest (53.97%) were living with smaller family size of less than four family members.

The percentage distribution of socio-economic factors were as follows; the regional distribution of all adolescents across the country were that; Tigray(12.855), Affar (6.77%), Amhara (12.85%), Oromiya (13.72%), Somali (4.0%), Benishangul-Gumuz (7.31%), SNNP (11.83%), Gambela (6.74%), Harari(6.92%), Addis Ababa (11.16%), Dire Dawa (5.84%), this distribution across the region among ever-married group had similar pattern.

Regarding literacy level measured in this survey with the educational level of the adolescents at the time of interview shows that, one in five (18.24%) adolescents have no any form of formal education, and overwhelming majority (65.935) of those who had some education, had only primary level of education, while only 15.83 of adolescents had education level of secondary level and above, among the ever-married group the literacy level suggested by similar measure of education level shows, the percentage of ever-married adolescents with

no any formal education rises to 39.83%, while those with primary education level were 53.97%, the proportion of ever-married women with education level of secondary and above sharply declines to only 6.2%.

Respondents religious affiliation was asked in the survey and the result was, Christian Orthodox (46.67%), followed by Muslims (34.43%), and then Protestants (17.63%), while those affiliated to Catholics and African Traditional Religion were only 1.26%, among the ever-married adolescents the affiliation to religion was, 43.18%, 40.07%, 15.63% and 1.12%, for Christian orthodox, Muslims, Protestant and Catholics and African Traditional Religion respectively. Employment status of the adolescent were also questioned and three fourth (74.485%) were unemployed and the remaining one-fourth had employment with paying job, among ever-married group the employment status is similar in that 76.67% were unemployed and 23.33 were employees.

The dependent variable of this study, live birth experience among all adolescents showed that, nearly 11 % of them had at least one live birth experience and the overwhelming majority (89.26%) did

not had and live birth experience, the live birth among ever-married adolescents was higher (42.68%) of them had an experience of live birth, while 57.32% of ever-married adolescents had no live birth experience at the time of the survey. 13.77% of ever-married adolescents were pregnant at the time of interview and this proportion is only 3.37% among all adolescents.

The use of contraception among all adolescents in the study revealed that only 6.38% of them had ever used any form of modern contraception, while 21.34% of ever-married adolescents had ever used a modern contraception. Adolescents in this study were also asked about the ideal family size that they want to have and their response was 29.04% of them wanted family size of up to 2 children, while 46.31% responded they would like to have three to four children, and 24.65% of them wanted to have more than four children, the response on question of ideal family size, among ever-married adolescents was, 18.11% replied they want to have up to two children, while 47.64% wanted to have three to four children, and the remaining 34.24% wanted to have more than four children.

Additional issues like chewing of khat and drinking of alcohol

were also included and the result revealed that, only 4.59% of all adolescents and 8.68% of ever-married adolescents chewed khat, while 35.82% of all adolescents and 42.48% of ever-married adolescents drunk alcohol.

Among ever-married adolescents additional factors like age at first marriage, husband education level and child death experience were considered and the results were as follows: 32.38% of ever-married adolescents were married before age of 15, while 55.33% of them were married by the age of 15-17, and the rest 12.28% were married between the age of 18 to 19. Concerning child death experience in this sub-group, 5.58% of them had had an experience of child death. Husband education level for ever-married adolescents showed that, 39.83% of them were married to husband with no education, and 41.94% were married to husbands with education level of primary level, while 18.24% of the women reported their husband's education level was secondary and above (Table 1).

Table 1 Characteristics of study population (N=3,323)

	All adolescents (N=3,323)		Ever-married adolescents (N=806)	
Characteristics	**n**	**%**	**n**	**%**
Age (Years)				
15	734	22.09	58	7.20
16	678	20.40	101	12.53
17	590	17.76	127	15.76
18	809	24.35	301	37.34
19	512	15.41	219	27.17
Marital status				
Never Married	2507	75.44	-	-
Sep./Wid./Div.	137	4.12	136	16.87
Married	679	20.43	670	83.13
Household size				
0-4	1088	32.74	435	53.97
5-8	1679	50.53	251	31.14
>8	556	16.73	120	14.89
Region				
Tigray	427	12.85	106	13.15
Affar	225	6.77	82	10.17
Amhara	427	12.85	156	19.35
Oromiya	456	13.72	98	12.16
Somali	133	4.00	31	3.85
Benishagul-Gumuz	243	7.31	94	11.66
SNNP	393	11.83	46	5.71
Gambela	224	6.74	83	10.30
Harari	230	6.92	52	6.45
Addis Ababa	371	11.16	25	3.10
Dire Dawa	194	5.84	33	4.09
Education level				
No-education	606	18.24	321	39.83
Primary	2191	65.93	435	53.97
Secondary and above	526	15.83	50	6.20
Religion				
Christian orthodox	1551	46.67	348	43.18
Muslim	1144	34.43	323	40.07
Protestant	586	17.63	126	15.63
Other	42	1.26	9	1.12
Employment status				
No	2475	74.48	618	76.67
Yes	848	25.52	188	23.33
Live birth experience				
No	2966	89.26	462	57.32
Yes	357	10.74	344	42.68
Current pregnancy				

No	3211	96.63	695	86.23
Yes	112	3.37	111	13.77
Contraceptive use				
No	3111	93.62	634	78.66
Yes	212	6.38	172	21.34
Ideal family size				
0-2	965	29.04	146	18.11
3-4	1539	46.31	384	47.64
>4	819	24.65	276	34.24
Chew khat				
No	3159	95.38	736	91.32
Yes	164	4.59	70	8.68
Characteristics	**n**	**%**	**n**	**%**
Drink alcohol				
No	2132	64.18	463	57.52
Yes	1190	35.82	342	42.48
Husband education level				
No education			321	39.83
Primary			338	41.94
Secondary and above			147	18.24
Child ever born				
0			481	59.68
1			270	33.50
2			49	6.08
3			6	0.74
Age at first marriage				
<15			261	32.38
15-17			446	55.33
18-19			99	12.28
Child death exp.				
No			761	94.42
Yes			45	5.58

Source: Ethiopian Demographic Survey, 2011

Education level: Primary education is from grade 1-8, Secondary education is 9-12th grade.

Religion: (Christian orthodox is form of Christianity which is equivalent to Coptic Christianity;

Other includes Traditional African faith and Catholics).

Live birth experience: the number of adolescents who had an experience of giving live birth

up to date of interview.

Region: administrative regions of Ethiopia. SNNP: Southern nation nationalities and People.

Khat: psychostimulant fresh green leaf known for its scientific name Catha edulis which has amphetamine like effect when chewed and its juices swallowed.

Sep./wid./Div.: Separated, Widowed, Divorced

4.2 Unadjusted association of each characteristic with adolescent fertility

The characteristics associated with live birth experience on bivariate analysis for all adolescents' showed that; the proportion of adolescents with live birth experience increases linearly with age, from 1.23% at 15 years of age, to 3.39%, 7.46%, 19.04%, and 24.02% at respective 16, 17, 18 and 19 years of age. Marital status was another factor which shows association with live birth experience, the percentage of live birth increases from 0.4% among never married adolescents to 24.09% for previously married adolescents, and 46.24% for married adolescents in union. As to the household size in which the adolescents live, there is association at bivariate analysis showing inverse relation of the family size and proportion of live birth experience: for those living in household of family size up to four, the percentage of live birth experience was 19.85%, while live birth proportion was 5.84% and 7.73% for those living in larger family size of five to eight and above eight respectively.

Significant difference in proportion of live birth experience was not observed among adolescents affiliated to different religions,

Christian orthodox adolescents had 8.90% live birth experience, while Muslims, Protestants, Catholics and African Traditional Religion followers had 13.20%, 10.58% and 14.29% live birth experience respectively. Employment status of the adolescents was also associated with live birth experience, shown with higher proportion of live birth experience among unemployed (8.96% vs. 11.35%).

Another characteristics associated with live birth was contraceptive use among adolescents; the proportion of live birth experience among contraceptive users was more than that of those not using any contraceptives 34.43% vs. 9.13%. Ideal family size was also associated with live birth, proportion of live birth experience increases as the number of children one would like to have increases, from 5.49% among those who wanted to have up to two children, to 10.16 % and 17.09% among those who wanted to have three to four children and those who wanted to have more than four children respectively.

Chewing khat was also associated with live birth experience; those chewing khat have higher percentage of live birth experience compared to non-khat chewers (21.95% vs. 10.16%). Drinking alcohol was not associated with live birth experience (Table 2).

Table 2 Unadjusted associations of each characteristics with live birth experience (N=3,323)

Characteristics	n	% of live birth	χ^2	p-value
Age (years)				
15	734	1.23		
16	678	3.39	260.48	<.0001
17	590	7.46		
18	809	19.04		
19	512	24.02		
Marital status				
Never Married	2507	0.40		
Sep. /Wid./Div.	137	24.09	1197.64	<.0001
Married	679	46.24		
Household size				
0-4	1088	19.85		
5-8	1679	5.84	141.56	<.0001
>8	556	7.73		
Region				
Tigray	427	10.77		
Affar	225	12.00		
Amhara	427	12.65		
Oromiya	456	11.18		
Somali	133	12.78		
Benishagul-Gumuz	243	18.93	92.81	<.0001
SNNP	393	5.60		
Gambela	224	20.54		
Harari	230	13.04		
Addis Ababa	371	1.08		
Dire Dawa	194	7.22		
Education level				
No-education	606	25.25		
Primary	2191	8.49	173.95	<.0001
Secondary and above	526	3.42		
Religion				
Christian orthodox	1551	8.90		
Muslim	1144	13.20	13.27	0.0041
Protestant	586	10.58		
Other	42	14.29		
Employment status				
No	2475	11.35	3.77	0.0523
Yes	848	8.96		
Contraceptive use				
No	3111	9.13	132.54	<.0001
Yes	212	34.43		

Ideal family size				
0-2	965	5.49		
3-4	1539	10.66	62.21	<.0001
>4	819	17.09		
Chew khat				
No	3159	10.16	22.59	<.0001
Yes	164	21.95		

Characteristics	n	% of live birth	χ^2	p-value
Drink alcohol				
No	2132	10.46	0.51	0.4749
Yes	1190	11.26		

Source: Ethiopian Demographic Survey, 2011

Education level: Primary education is from grade 1-8, Secondary education is 9-12th grade.

Religion: (Christian orthodox is form of Christianity which is equivalent to Coptic Christianity; other religion includes Traditional African faith and Catholics).

Live birth experience: the number of adolescents who had an experience of giving live birth up to date of interview.

Region: administrative regions of Ethiopia. SNNP: Southern nation nationalities and People.

Khat: psychostimulant fresh green leaf known for its scientific name Catha edulis which has amphetamine like effect when chewed and its juices swallowed.

Sep./wid./Div.: Separated, Widowed, Divorced

For ever-married adolescent group, a separate bivariate analysis was conducted and it showed that, among demographic factors; age, household size and region were associated with live birth experience, and among socio-economic factors; education level, religion were significantly associated with the outcome variable, and among fertility related factors; child death experience, age at first marriage and ideal family size all were strongly related to live birth experience, and factors associated with behavior like chewing khat or drinking alcohol had also been found to be associated with live birth experience. While factors like contraceptive use, husband education level and employment status of the adolescents were not significantly associated with live birth experience among ever-married group analysis (Table 3).

Table 3 Unadjusted associations of each characteristic with live birth experience: Ever-married adolescents (N=806)

Characteristics	n	% of live birth	χ^2	p-value
Age(years)				
15	58	13.79		
16	101	24.75	59.232	<.0001
17	127	31.50		
18	301	50.50		
19	219	54.34		
Household size				
0-4	435	48.74		
5-8	251	36.25	14.311	0.0008
>8	120	34.17		
Region				
Tigray	106	43.40		
Affar	82	32.93		
Amhara	156	33.97		
Oromiya	98	47.96		
Somali	31	54.84		
Benishagul-Gumuz	94	47.87	24.683	0.0060
SNNP	46	45.65		
Gambela	83	49.40		
Harari	52	55.77		
Addis Ababa	25	16.00		
Dire Dawa	33	42.42		
Educational level				
No education	321	47.04		
Primary	435	40.23	4.536	0.1035
Secondary and above	50	36.00		
Religion				
Christian orthodox	348	37.93		
Muslim	332	46.69	5.723	0.0572
Protestant	126	45.24		
Employment status				
No	618	43.85	1.486	0.2229
Yes	188	38.83		
Husband education level	321	41.12		
No education	338	43.49	2.504	0.4745
Primary	147	44.22		

Secondary and above				
Contraceptive use				
No	634	43.38	0.587	0.4434
Yes	172	40.12		
Child death experience				
No	761	39.29	64.009	<.0001
Yes	45	100.00		
Age at first marriage				
<15	261	57.09		
15-17	446	41.03	60.433	<.0001
18-19	99	12.12		

Characteristics	**n**	**% of live birth**	**χ^2**	**p-value**
Ideal family size				
0-2	146	32.19		
3-4	384	41.67	12.187	0.0023
>4	276	49.64		
Chew khat				
No	736	41.85	2.398	0.1215
Yes	70	51.43		
Drink alcohol				
No	467	46.47	6.769	0.0093
Yes	384	37.36		

Source: Ethiopian Demographic Survey, 2011

Education level: Primary education is from grade 1-8, Secondary education is 9-12th grade.

Religion: (Christian orthodox is form of Christianity which is equivalent to Coptic Christianity; other religion includes Traditional African faith and Catholics).

Live birth experience: the number of adolescents who had an experience of giving live birth up to date of interview.

Region: administrative regions of Ethiopia. SNNP: Southern nation nationalities and People.

Khat: psychostimulant fresh green leaf known for its scientific name Catha edulis which has amphetamine like effect when chewed and its juices swallowed.

Sep./wid./Div.: Separated, Widowed, Divorced

4.3 Adjusted associations of each characteristics with adolescent fertility

Two separate multivariate analyses were preformed (for all adolescents and ever-married adolescents). In the first model for all adolescents, age, marital status, region and education level were found to be strong differentials of adolescent live birth experience (fertility). Increase in age tended to increase once odds ratio of having live birth experience, relative to those at15 years of age, those at 16, 17, 18 and 19 year of age had, 2.39 (95%CI 1.031-5.581), 3.70 (95%CI 1.642-8.352), 7.11 (95%CI 3.325-15.210) and 9.79 (95%CI 4.487-21.368) odds ratio of having live birth experience respectively.

Adolescents who were previously married and at the time of interview were either separated, divorced or widowed and adolescents who were in marriage union had significant differential of the live birth experience, compared to never-married adolescents, the odd ratio of ever-married adolescents was 49.93 (95%CI 23.234-107.333) and those of adolescents in marital union was 111.08 (95%CI 56.864-217.008). Adolescents living outside the capital Addis Ababa had higher odds ratio compared to those living in the capital: Tigray 4.83 (95%CI

1.472-15.879), Amhara 3.73 (95%CI 1.180-11.822), Oromiya 5.06 (95%CI 1.554-16.502), Somali 4.08 (95%CI 1.044-15.961), Benishangul-Gumuz 6.14 (95%CI 1.868-20.194), SNNP 4.294 (95%CI 1.176-15.677), Gambela 10.37 (95%CI 3.008-35.792), Harari 7.230 (95%CI 2.058-25.394).

Adolescents education status was also one of the most important differential explaining the variability of live birth experience among adolescents, compared to adolescents with no formal education adolescents with secondary and above level of education had significantly lower odds ratio, 0.414 (95%CI 0.210-0.819). while household size, religion, employment status, contraceptive use, ideal family size, chewing khat did not show any significant association with adolescents live birth experience in the multivariate analysis for all adolescent group (Table 4).

Table 4 Adjusted associations of each characteristics with live birth experience: All adolescents (N=3,323)

Characteristics	n	OR	95%CI	p-value
Age(Years)				
15	734	1.000		
16	678	2.399	1.031-5.581	0.0422
17	590	3.703	1.642-8.352	0.0016
18	809	7.111	3.325-15.210	<.0001
19	512	9.792	4.487-21.368	<.0001
Marital status				
Never Married	2507	1.000		
Sep. / Wid. / Div.	137	49.937	23.234-107.333	<.0001
Married	679	111.085	56.864-217.008	<.0001
Household size				
0-4	1088	1.000		
5-8	1679	0.814	0.573-1.158	0.2527
>8	556	0.749	0.473-1.186	0.2178
Region				
Addis Ababa	371	1.000		
Tigray	427	4.835	1.472-15.879	0.0094
Affar	225	2.328	0.661-8.197	0.1881
Amhara	427	3.735	1.180-11.822	0.0250
Oromiya	456	5.064	1.554-16.502	0.0071
Somali	133	4.081	1.044-15.961	0.0432
Benishagul-Gumuz	243	6.142	1.868-20.194	0.0028
SNNP	393	4.294	1.176-15.677	0.0274
Gambela	224	10.376	3.008-35.792	0.0002
Harari	230	7.230	2.058-25.394	0.0020
Dire Dawa	194	3.394	0.896-12.864	0.0722
Education level				
No-education	606	1.000		
Primary	2191	0.780	0.552-1.104	0.1608
Second and above	526	0.414	0.210-0.819	0.0112
Religion				
Christian orthodox	1551	1.000		
Muslim	1144	1.074	0.674-1.710	0.7645
Protestant	586	0.915	0.502-1.665	0.7700

Other	42	1.901	0.465-7.778	0.3716
Employment status				
No	2475	1.000		
Yes	848	0.790	0.547-1.142	0.2098
Contraceptive use				
No	3111	1.000		
Yes	212	0.916	0.616-1362	0.6641

Characteristics	n	OR	95%CI	p-value
Ideal family size				
0-2	965	1.000		
3-4	1539	1.153	0.755-1.763	0.5098
>4	819	1.550	0.954-2.518	0.0766
Chew khat				
No	3159	1.000		
Yes	164	1.303	0.746-2.276	0.3520
c-statistic		0.949		
H-L Test, χ^2, (p-value)		3.53(0.8969)		

H-L Test: Hosmer Lemshow Test.

Source: Ethiopian Demographic Survey, 2011

Education level: Primary education is from grade 1-8, Secondary education is 9-12th grade.

Khat: psychostimulant fresh green leaf known for its scientific name Catha edulis which has amphetamine like effect when chewed and its juices swallowed.

Sep./wid./Div.: Separated, Widowed, Divorced

In the second model, for ever-married adolescents; age, household size of greater than eight family members, regions (Tigray, Oromiya, SNNP, Gambela, Harari), age at first marriage, and ideal family size of greater than four children were significantly associated with adolescent live birth experience.

Similar to the all adolescents group, increment in age has significant effect in raising the odds ratio of live birth experience to; 3.44 (95%CI 1.350-8.765), 5.37 (95%CI 2.163-13.372), 18.293 (95%CI 7.628-43.867) and 32.903 (95%CI 13.149-82.337) for adolescents at 16, 17, 18 and 19 years of age, compared to adolescents at 15 years of age. The size of family members in which ever-married adolescents live also has significant depressive effect on odds ratio of live birth experience; compared to those ever-married adolescents living with household size of less than four members, those living with bigger household size of eight or more members had odds ratio of 0.579 (95%CI 0.343-0.979).

The geographic distribution, where adolescents live in the country had effect on adolescent fertility, higher odds ratio had been observed for some regions in this study; Tigray 4.18 (95%CI 1.177-

14.892), Oromiya 3.740 (95%CI 1.056-13.254), SNNP 4.512 (95%CI 1.086-18.742), Gambela 5.352 (95%CI 1.432-19.998) and Harari 4.05 (95%CI 1.037-15.853) odds ratio of live birth experience compared to adolescents living in Addis Ababa (Capital).

One of the most important predictor of adolescent live birth experience (Fertility) was the age at first marriage of the adolescents; the lower the age at which adolescent were married, the higher the odds ratio for live birth experience. In ever-married adolescent's model, adolescent in group 15-17 years of age and adolescents in group 18-19 years of age, were compared to those adolescent group married before 15 years of age; interestingly delay in marriage was found to be protective of live birth experience. The odds ratio for those adolescent's group married at of 15-17 years of age was, 0.259 (95%CI 0.173-0.388), and for those adolescent's group married at of 18-19 years of age, odds ratio was 0.025 (95%CI 0.012-0.053). Adolescents, who ideally wanted to have more children as their preference, had higher odds ratio of live birth experience 1.792 (95%CI 1.032-3.114), compared to those adolescents who wanted to have ideal family size of up to two children.

In the ever-married adolescent's group model, in multivariate analysis, education level, religion, employment status, husband education level, contraceptive use and chewing khat were not found to be significantly associated with live birth experience (Table 5).

Table 5 Adjusted associations of each characteristic with live birth experience: Ever-married adolescents (N=806)

Characteristics	n	OR	95%CI	p-value
Age(years)				
15	58	1.000		
16	101	3.440	1.350-8.765	0.0096
17	127	5.378	2.163-13.372	0.0003
18	301	18.293	7.628-43.867	<.0001
19	219	32.903	13.149-82.337	<.0001
Household size				
0-4	435	1.000		
5-8	251	0.694	0.467-1.029	0.0694
>8	120	0.579	0.343-0.979	0.0414
Region				
Addis Ababa	25	1.000		
Tigray	106	4.187	1.177-14.892	0.0270
Affar	82	1.163	0.301-4.492	0.8266
Amhara	156	1.873	0.546-6.425	0.3182
Oromiya	98	3.740	1.056-13.254	0.0409
Somali	31	2.424	0.549-10.696	0.2423
Benishagul-Gumuz	94	2.476	0.699-8.770	0.1599
SNNP	46	4.512	1.086-18.742	0.0381
Gambela	83	5.352	1.432-19.998	0.0126
Harari	52	4.055	1.037-15.853	0.0442
Dire Dawa	33	2.110	0.499-8.914	0.3100
Educational level				
No education	321	1.000		
Primary	435	0.860	0.573-1.291	0.4676
Secondary and above	50	0.529	0.224-1.248	0.1461
Religion				
Christian orthodox	348	1.000		
Muslim	332	1.148	0.573-2.302	0.6966
Protestant	126	1.642	0.961-2.805	0.0694
Employment status				
No	618	1.000		
Yes	188	0.733	0.483-1.112	0.1444
Husband education level				
No education	321	1.000		
Primary	338	1.000	0.669-1.496	0.9985
Secondary and above	147	1.164	0.649-2.089	0.6104
Contraceptive use				
No	634	1.000		
Yes	172	1.039	0.664-1.625	0.8676
Age at first marriage				

<15	261	1.000		
15-17	446	0.259	0.173-0.388	<.0001
18-19	99	0.025	0.012-0.053	<.0001
Ideal family size				
0-2	146	1.000		
3-4	384	1.383	0.851-2.247	0.1908
>4	276	1.792	1.032-3.114	0.0384
Chew khat				
No	736	1.000		
Yes	70	0.956	0.506-1.805	0.8896
C- Statistics		0.807		
H-L, χ^2p-value		5.68(0.6824)		

H-L Test: Hosmer Lemshow Test.

Source: Ethiopian Demographic Survey, 2011

Education level: Primary education is from grade 1-8, Secondary education is 9-12th grade.

Khat: psychostimulant fresh green leaf known for its scientific name Catha edulis which has amphetamine like effect when chewed and its juices swallowed.

Ⅴ. DISCUSSION

5.1 Study design and methods

This study was a cross-sectional study, of the Ethiopian Demographic Health Survey data (EDHS, 2011). In previous researches to investigate determinants of adolescent fertility, similar cross-sectional studies were used (Gebremedhin & Betre, 2009; Gurmu & Mace, 2008; Mekonnen & Worku, 2011a, 2011b; Sibanda et al., 2003). The strength of this study was that, it used a nationally representative data, and the most recent data of the EDHS, therefore it is believed that it would reflect the recent determinants on fertility of Ethiopian female adolescents. Additional strength of this study was that, thorough cleaning of the data was conducted. The total adolescents number extracted from the women's individual data of EDHS, 2011 were 3,835, after thorough cleaning 3,323 were put to the final analysis. Furthermore, multicollineality between independent variables were checked before regression analyses were conducted.

To investigate the influence of independent variables like: age,

marital status, household size, religion, education level, region, contraceptive use, ideal family size, substance use on the adolescent live birth experience; logistic regression analyses were performed. In the regression analyses the outcome variable was live birth experience.

5.2 Considerations of the study results

In this study, it has been found that, adolescents in Ethiopian have higher fertility. Among all adolescents in the study 11% of them had live birth experience and about 21% of all had already been married. This higher percentage of adolescent fertility indicates that, more reproductive health programs and services are highly needed. All adolescents regardless of their demographic, socio-economic and behavioral patterns would benefit from programs focusing on providing adequate knowledge, skill and services on adolescent sexual and reproductive health. There have been wider discrepancies among adolescent fertility across adolescent age, marital status, household size, where they live (region), use of contraception, employment status, according to the findings of this study.

The overall female adolescent fertility observed in the present study was 11% with additional 3.37% pregnant making adolescent child

bearing rate of 14.37% implying that one out of six adolescents aged between 15 and 19 years were either pregnant or had already given birth. Compared to other countries in the region, the adolescent fertility rate in Ethiopian is relatively lower than the rates for Kenya, Uganda, Tanzania, and Malawi which were 18.5%, 19.2%, 19.6%, and 25.3% respectively, but higher than some African countries like Eritrea 11% and Rwanda 3.3% (Jain & Ross, 2012).

In this study adolescents aged 16 years were about 2.4 times more likely to be fertile, while those aged 17 were 3.7 times more likely to be fertile than adolescents at 15 years of age. Similarly adolescent's aged 18 were 7.1 times more likely to be fertile while those aged 19 were almost 10 times more fertile when compared to adolescents aged 15. Similar findings have been documented in studies conducted in Ethiopia (Mekonnen & Worku, 2011a). As the age increases, the risk of exposure to pregnancy and child bearing also increases significantly, because of higher chances of getting sexual relation, and getting married is also a relatively high possibility making sexual relations and child bearing socially acceptable phenomenon. In this study the percentage of live birth linearly increases with the age of the adolescents, for

adolescents aged 15 the percentage of live birth experience was only 1.23% and this number increases to 24% for those aged 19 at the time of interview.

In addition, a sub-group analysis done for ever-married adolescents revealed similar pattern of increase in percentage of adolescents who had live birth experience. Increase in age, among ever married women in this study showed increse in perccentage of live birth experience; 14.5% of adolescents at 15 years of age had live birth experience, while 54.5% of adolescents had live birth experience at 19 years of age. Similarly in logistic regression the risk of having live birth experience is 3, 4.8, 16.9 and 29.6 times higher for ever-married adolescents aged 16, 17, 18 and 19 respectively. This clearly idicates that, adolescents in marriage have significantly increased exposure to pregnancy and childbearing early in life.

Another similar and related finding from this study was the marital status of adolescets is closely linked with their fertility, of the total adolescetns in the study 21% of them are married and the percetage of live birth distribution shows that percetange of live birh is 0.4% among never married women, while it is 24.1% and 46.24% among

women with previous marriage history and among those marreid respectively. Compared to the non-married adolescents those previously married have 50 times more exposure to live bith experience and those in marriage have even more higher odds ratio calculated to be 110 times more.

Early marriage is quite a common practice worldwide and it is still beign practiced particularly in low and middle income countires. This have been documented in studies conducted in Latin America, Asia, Middle East and in Africa (Ezeh et al., 2009; Jain & Ross, 2012; Tezcan & Adali, 2012; Walker, 2012).

The other important differential of adolescent fertility is age at marriage, the ealier the marriage the longer is the fertility period of a women. The age at marriage also entails, earlier start of child bearing and ultimately, these adolescents end up having many more childrens by the time they complete their fertility. In present study age at marriage for ever-married sub-group analysis revealed that, 32.7% of them were married before the age of 15, and 55% of the ever-married adolescents were married in the age range of 15 to 17, and 12.25% were married at the age range of 18-19, this show majority of the

adolescents ever-married, get married very young.

An increase in the age at first marriage has a negative effect on higher fertility, early marriage results in sexual union and beginning of exposure to child bearing, while delay adolescents marrying at older age have greater likelihood that, they attended school or have a paying job and better experience in life, these all combined provide better opportunity to decide on when and how many children they want to have in their family (Adhikari, 2010).Findigs are similar to other studies that find that older age at first marriage singnificanlty impact fertility (Gurmu & Mace, 2008).

Further more this study has found that adolscents who live outside the capital, Addis Ababa, in different parts of the administrative regions have higher adolescent fertility compared to adolescents living in the capital. Fertility was higher in adolescents living in regions: Tigray, Amhara, Oromiya, Somali, Benishagul-Gumuz, Southern nation nationalities and peoples, and Harari.

In this study, regions where adolescents live was one of the important predictors in determining adolescent fertility, this study is

similar in this with other studies which have found below replacemtne level fertility for women living in Addis Ababa (Gurmu & Mace, 2008; Sibanda et al., 2003).

One reason could be that adolescents which who live in regions are more likely to have lesser access to sexual and reproductive health services, leading to low prevalence of contraceptive use and higher fertility among adolescents, the other reason could be that, adolescents living in the regions get married earlier than those livign in the capital, as the mean age at first marriage among adolescents in Addis Ababa and those living out side the capital has difference of more than 5 years according to one study conducted in Ethiopia (Sibanda et al., 2003).

Similarly, the higher live birth experience among adolescents living in those regions could be because, those regions are generally speaking less developed than the capital, regions like Gambela, Somali, Benishalgul-Gumuz, some parts of SNNP are remote and inaccessible and coverage of basic health care is lower. Other regions like Tigria, Amhara, Oromia, SNNP are regions which are densely populated and where the majority of Ethiopian population live.

It is a well documeted fact that adolescent fertility is negatively associated with the adolescents educational status(Do & Kurimoto, 2012; Omariba, 2006; Woldemicael, 2009). The hypothesis of this study was that, adolescents education level would have an impact on their fertility level, those with lower education level have higher live birth experience than their literate ones.

The proportion of adolescent with no primary education is alarming and unacceptable as it was nearly one in five adolescents in the survey had no any form of formal education (18.24%), among those who had some form of formal education the majority of adolescents had only educational level of primary level (65.93%) and only limited proportion of the adolescents had a chance to attend secondary level and above education.

There were wide discrepancies in percentage of live birth experience in this study groups, those with no formal education had almost eight times the proportion of live birth experience of those with secondary and above education (25.5% vs 3.4%). Similarly education level of secondary and above have been found to be strongly significant in reducing the riks of having live birth experience by arround 60%

with OR of 0.414 (95% CI 0.210-0.864). Education level of primary level has not been found statistically significant in preventing against live birth experience. There is an inconsistent results in researches across SSA on the impact of primary education level on adolescent fertility (Bongaarts, 2003; Dehlendorf, Marchi, Vittinghoff, & Braveman, 2010; Kravdal, 2002; Mekonnen & Worku, 2011a; Were, 2007).

Education opens a window of opportunity, by enabling access to more information and knowledge, which empowers adolescents, creates better chance of getting employment in outside environment, it makes one more aware and take responsibility of their own health and that of their children and the family as a whole, all of which are counter enableres to adolescent fertility and its associated consequences. Similarly educated women are more likely to delay marriage, have smaller family size and use family planning methods than uneducated women (Were, 2007).

In recent years there is an increase in efforts to promote girls education, by government and civil societies to improve the accessibility of education to all regions of the country. This has been

stregthened with the Millenium Development Goals (MDG), emphasis on adressing primary education to all in developing countries like Ethiopia. As a result, there is a rapid expansion of schools in the country, this has resulted in massive increament in enrollment of students to schools, and the proportion of female students attending the school has continously increased over the past few years, those students which completed their primary education in the rural parts often have to move to smaller towns in the near by area, and this has created new phonomenon in the country, where young people are living a relatively unrestricted life, far from the family and the society who knew them well. It has been a recent fact that, this increase in attendance in secondary school level has come with the down side of rising uninteded pregnancy and its associated complications, in absence of targeted progarms addressing these vulnerable groups.

Schools are now, not only places for acquisition of knowledge and skills, they have also become places where adolescents meet each other and socialize, the traditional role of schools in a resource limited set up has not prepared it self for the rising extra curicular demands of the increasing students.

Among the ever-married adolescents, the effect of education wa s not statistically significant, this could be due to the fact that once, they are in marriage, it is obvious that adolescents will be exposed to having sexual intercoures and thus having live birth experience.

The other interesting finding in this study was the finding that ideal family size one wants to have in life will affect the fertility, as those who want to have a bigger family size would try to achieve it, among ever-married adolescents those who wants to have more than four children were positively associated with having live birth experience with OR of 1.757 (95% CI 1.027-3.006), but for all adolescents ideal family size was not significant in contrary to other findings (Adhikari, 2010; Ibisomi et al., 2011; Mekonnen & Worku, 2011a).

Whether the adolescetns have been living in different family size households were examined in this study and it was found that, this is insignificant for all adolescents, while it was marginally significant and protective in ever-married group adolescetnts, that is ever-married adolscents living in larger family size househods tend to reduce their fertility, this could be because they have first hand witness of the

challenges of having bigger family size, previous studies on this matter described married adolescents living with extended family size, particularly those living with parents or grand parents tend to have higher fertility (Hogan, Berhanu, & Hailemariam, 1999; Kulin, 1988).

5.3 Policy implication of adolescent sexual and reproductive health

This study has analyzed a nationally representative data, from the most recent Demographic and Health Survey of 2011, taking the individual survey data to look in to the topic of interest; socio-demographic determinants of adolescent fertility.

Population growth is the global challenge, and it is much worse in countries with low income like Ethiopia, though the overall population growth has shown some decline from early 1990 of 3.1% per year to 2.6% per year in 2005, there has been continuous increase in the number of general population, this uncontrolled increase in population growth has already been taking its toll on the development aspiration of the country.

Cognizant of uncontrolled population growth challenges, the Ethiopian government has been working on controlling fertility, among

the first target group is reducing the fertility of reproductive age women of the country, this goes directly by identifying the most vulnerable group and intervention high response group and adolescents should be the among the primary target group of any interventions focusing on reducing fertility.

This study indicated that adolescents get married early in their life and expose to pregnancy and early child bearing, which leads to high number completed fertility by the end of their reproductive years, hence the first target area should focus on ways to increase age at marriage, though Ethiopia has enacted marriage law, depicting the legal age of marriage to be 18 years of age and above, but as revealed in this study this law is largely unknown or ignored by significant proportion of the Ethiopian population. Policy makers have to focus on findings ways to enforce the in acted family and marriage law, mainly in creating broader awareness on challenges of early marriage and its consequences among the wider population. In addition to this enforcement of the law will also help in reducing the early marriage of adolescents in the country.

Another interesting finding from this study was, the wide

discrepancy in adolescent fertility in different regions of the country, regions like Tigray, Amhara, Oromiya, SNNP, Somali, Benishagul-Gumuz and Harari were observed to have higher odds ratio of live birth experience for adolescents living these regions, particularly regions like Gambela had nine times higher odds ratio of live birth experience, while Harari had seven six times, and Benishangul-Gumuz five times higher odds ratio of live birth experience.

These regional discrepancies needs to be addressed by policy makers in ensuring equal opportunity to all adolescents of the country, by providing universal access to basic sexual and reproductive health services. Targeting, regions with higher fertility pattern will have negative impact on the fertility of adolescents living in those regions.

The other important finding in this study was that, the significantly negative association of education level and adolescent fertility, adolescents with secondary and above education were strongly protected from adolescent fertility, as education translates to better knowledge and empowers one in making informed decision about choices in their life's, the policy implication of this is that, education for girls should be highly emphasized and focusing on improving girls

school enrollment, reducing school drop outs and keeping girls at school should be the primary effort in education policy.

Similarly this study revealed that education level of, no-education and primary level were not strongly protective of adolescents fertility. It is of notice that, nearly 85% of the study adolescents had no formal education or have only primary level of education, this should be another area of focus for policy makers, to provide a these vulnerable adolescents with, universal access to education, expansion of education facilities in all regions of the country and eradication of illiteracy. These combined will improve the adolescent fertility level and foster the development agenda of the country at large.

5.4 Limitations and future research agenda

There are some limitations of with regard to interpretations of the results of this study. Due to the cross-sectional design of the study and all the variables analyzed in the regression model, it can only provide evidence of a statistical association between those variables and the live birth experience and cannot show a cause-effect relationship.

In addition to this the measure of adolescent fertility, live birth

experience, suffers from problems of censoring as it includes whether the adolescents had an experience of live birth to the date of survey. Probably the more precise way to measure adolescent fertility would be the measure adolescent conception (Pregnancy) rate, but it would be less practical, as it would be very difficult to know whether pregnancy had occurred in cases of early abortion, furthermore Ethiopia lacks a vital statistics which tracks and registers every pregnancy and abortion that had happened, this makes this more precise measure less usable. In Ethiopian and many developing countries adolescents tend to be less open about their sexuality and reproductive history, this is particularly the case if the live birth experience happened outside wedlock, and in some cases if it happens, family would give the new infant for foster to families living far from their communities or to child foster organizations, as this would threaten the chance of the young adolescent to get married and as widely believed that this experience would affect the status of the family in the community where they live.

Another error that could happen with live birth measure is the wrong inclusion of still birth or late fetal death among live birth. However, data of the Demographic Health Surveys are good quality data

to estimate fertility for all age group women of reproductive age group(Bongaarts, 2009).

Another limitation of the study in fully understanding the adolescent fertility in Ethiopia is the fact that the study did not included male adolescents which should be the integral part of the problem. Further studies are needed to analyze how male adolescents contribute in this process.

The study also did not have qualitative information to substantiate the findings in the quantitative analyses, and further studies should include focused group discussions and in-depth interviews with male and female adolescents, service providers, community and religious leaders.

Ⅵ. CONCLUSION

Sub-Saharan Africa is the world's fastest growing region in its population number, this is intensified by the high fertility rate and low contraceptive prevalence rate, despite the increased mortality secondary to infectious diseases like HIV/AIDS, the continents population have exceeded one billion, and it is expected to continue growing for the coming century (Bongaarts, 2009). Ethiopia being located in Sub Saharan Africa, shares the characteristics defining the region; poor socio economic development, high unemployment, early marriage, high fertility rate, low contraceptive prevalence rate, high proportion of unsafe abortion.

This study focused on the adolescents of Ethiopia, and it indicated similar patterns which is, high adolescent fertility rate, expressed in higher percentage of live birth experience in this study. Many factors contribute to this phenomenon, among these factors, age, age at first marriage, region, education level, household size, ideal family size, contraceptive use, marital status, substance use like drinking alcohol or chewing khat are some of the important contributors to fertility.

The main results in this study were as follows; 11% of the adolescents analyzed had already given at least one live birth and nearly 21% have already been married, and more than 66% of the adolescents live in larger family size and it seems this is a relatively normal pattern in the country as the response given to the question on the ideal number of family size one would like to have at the end of reproduction completion shows 25% of adolescents replied that they want to have more than four children.

The literacy status of the adolescents in the study group, measured with the level of education they have attended showed that, majority of them (85%) have lower literacy status. As an obvious consequence to adolescents low literacy level, the employment status was only one in four adolescents, and the contraceptive use rate was only 3.3%, and the alcohol use was quite common as the results suggests, which was 35.8% and khat chewing was only 4.6%, this figure is expected to rise sharply as the use of this green leaf psycho active drug is widely being practiced.

The most important factors influencing adolescent fertility in this study were age, marital status, region and educational level for all

adolescents and for ever-married adolescent group, the most significant predicators of fertility were age, age at first marriage, region and ideal family size.

In conclusion of this study, the target of any form of interventions to reduce fertility in Ethiopia, focusing on adolescents should work towards increasing age of marriage, by creating awareness of the existing marriage and family law and enforcing the law, improve accessibility of sexual and reproductive health services to regions of the country which showed highest fertility and most importantly focus on improving the educational status of adolescents by increasing their school enrollment and working towards retaining girls in school for as long as possible.

In general adolescents in Ethiopia are faced with multiple interrelated challenges, and it is worsened by inadequate knowledge and skills, it looks like they are marching in to the rough sea of adolescence uninformed and unequipped, and it would be very wise to help these large proportion of the countries youth to inform and equip them with better knowledge and skills, which enables them to sail to the other side of the sea. Furthermore, this experience at young age

would give them wisdom and confidence, for the rest of journey in life.

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